The Role of Chronic Cholecystitis in the Production of Indigestion.

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THE view that chronic cholecystitis is the commonest organic cause of indigestion is widely held. In support of this contention Eusterman,[1] from a study of patients in the Mayo Clinic exhibiting gastric symptoms, states that there are sixty per cent. more cases associated with a diseased gall-bladder than with a peptic ulcer. To understand and estimate the value of such a statement, it is necessary to review shortly the physiology of the liver and the biliary tract if we are to appreciate the changes which arise under pathological conditions.

Among the many-sided activities of the liver, we will only consider those having a bearing on the subject of this contribution.

(*a*) *The storage of glycogen.* This function is possibly the most important, as in diseased conditions of the organ the blood-sugar level falls owing to shortage of dextrose. This loss of function can be temporarily restored by administration of glucose preparatory to dealing with the cause.

(*b*) *The secretion of bile salts and bile acids which assist the pancreatic ferments to split fats into fatty acids and glycerin.* Failure of this function results in excess fats in stools, due to faulty fat metabolism.

(*c*) *Detoxifying power.* Opie[2] concludes that the liver, by means of its peculiar eipthelium lining its sinusoids, fixes insoluble material and many kinds of organic particles such as bacteria.

The value of such a function in diseases due to infection arising in the intestinal tract is apparent.

Investigation into the function of the gall-bladder has been greatly assisted by the introduction of cholecystography. It is now possible to visualize the viscus and observe its size and shape, its filling and emptying, its density as illustrating its power of absorption, and its varying reactions to the ingestion of proteids, carbohydrates, and fats.

From its construction, the gall-bladder is evidently intended for the storage of only a small quantity of bile, but owing to the transference of water through its walls, concentration occurs. This concentrated bile is discharged when the neuromuscular mechanism relaxes the sphincteric action at the distal end of the common duct. A gall-bladder, therefore, to act in a normal manner, must be capable of distension and collapse, must have an unobstructed cystic duct and a mucosa able to secrete and absorb.

Following chronic infection of the gall-bladder, naked-eye changes occur, such as alteration in its colour, increase in thickness of its wall, deposit of fat in the wall, and a general fibrosis. These changes affect the adjacent liver through the

communicating lymphatics, producing a greyness of its surface and later a hardening of its structure and a rounding of its edges. As a consequence of this infection of the liver, the bile produced may be deficient in some of its normal constituents and contain abnormal ingredients, and so fail to carry out its rôle in assisting intestinal digestion and intestinal elimination. In other words, intestinal indigestion occurs.

The routes by which the biliary tract may be infected are four in number :—

(*a*) Descending through the bile stream.

(*b*) Ascending from the duodenum.

(*c*) Blood-borne.

(*d*) By way of lymphatic stream.

Bearing in mind the characteristic changes which occur in all coats of the gall-bladder in chronic cholecystitis, from the mucosa to the serosa, it is not possible to regard the biliary route as frequent, as in the absence of injury to the protective lining of the bladder, the mere bathing of its coat with a bacteria-laden fluid would not cause the extension to the deeper coats which is always present.

Considering that the liver acts as a filter between the portal and systemic blood-streams, and that predisposing causes of infection can usually be detected in the alimentary canal or pelvic viscera, it is probable that infection is most commonly conveyed by the blood or lymphatics.

A point in favour of one of these routes is that it is not uncommon to find the bile sterile, while cultures made from the wall show growths. For a considerable period it was my practice, on removing a gall-bladder, to wrap it up in sterile gauze and send it to the laboratory, where Sir Thomas Houston carried out the investigation. His valued opinion confirmed the previous statement.

Before leaving the pathology of the gall-bladder, the interesting condition known as "strawberry gall-bladder" may be referred to. This presents itself usually without the appearance of chronic inflammation. The wall may not be thickened, its colour not noticeably different from normal, while stones may or may not be present. In other words, its diagnosis prior to removal is impossible.

Boyd thinks that cholesterol is normally absorbed from the gall-bladder, and if something interferes with the normal absorption, the strawberry gall-bladder results. He thinks, moreover, that the most probable factor in preventing the normal absorption is chronic infection.

Whether the retention of cholesterol in the mucosa is due to failure to eliminate it from the bile in gall-bladder, or due to its deposit from the blood, is still uncertain, but it is believed to be evidence of faulty fat metabolism.

Taking pain, nausea, vomiting, flatulence, and eructations as the commonest symptoms of indigestion, what is their relative frequency in chronic cholecystitis?

I have examined the case sheets of 266 consecutive patients treated by myself in the Royal Victoria Hospital for affections of the biliary system during the years 1929 to 1934 inclusive, and find that the frequency of symptoms was as follows :—

Pain in upper abdomen or referred to shoulder	220
Indigestion and flatulence	143
Nausea or vomiting, or both	86
Chills or rigors	23

The pain may be situated in right upper quadrant and segmentally referred to the shoulder blade, when it is suggestive of acute inflammation or impaction of a stone, and is accompanied by some rigidity in that area and deep tenderness on expiration; or a diffuse pain over the upper abdomen accompanied by a sensation of fullness and desire to bring up wind.

Scrimger[3] offers a theory of the production of gastric symptoms on the basis of nerve distribution. "A stone in the cystic duct may cause pain through its sympathetic connections with fifth to ninth dorsal segments. At the same time vagus reflexes are set up, causing muscular spasms of stomach and intestine with increased secretion. In less acute conditions, vagus reflexes may predominate, and in the intervals there may be disturbed function of stomach or intestine, eructations of gas, hypermotility, hyperacidity, and constipation."

It appears that no definite association exists of gastric acidity in chronic cholecystitis, as hyperchlorhydria and achlorhydria have been demonstrated as being present in varying proportions of published cases.

As predisposing causes of cholecystitis, may I be forgiven for quoting the well-known alliteration: "Female, fat, fertile, and forty"; it conveys a mental picture which is suggestive.

It is accepted that this is a disease affecting women more than men in proportion of two to one or even higher, and the significance of age, sex, and pregnancy in its production lies in the greater tendency to inactivity and consequent stasis in women. This inactivity, whether due to occupation or childbearing, favours infection.

The obesity which is frequently present is not, in my opinion, a predisposing cause, but a direct outcome of the disease. As has been shown above, faulty fat metabolism exists, and no amount of exercise or regulation of diet will produce a reduction. Subjects of cholecystitis are not big eaters, and have already learnt to avoid fatty or greasy foods.

In investigating a suspected case of chronic cholecystitis, careful questioning into the personal history is of importance, as it may reveal a possible source of origin. For example, a history of peptic ulcer, of appendicitis, of colitis, of typhoid or the infectious fevers, is of extreme value.

It should be remembered that the onset of this disease is very slow, and it may be years after an infection before symptoms arise sufficiently distressing to demand attention.

It will be seen that a diagnosis may be difficult if reliance is put only on symptoms and signs, and in this connection I have purposely avoided the mention of jaundice. This sign will only be present in cholecystitis if common duct obstruction or cholangitis complicate the condition. To aid in diagnosis and help determine liver function, cholecystography is of first importance.

The outstanding symptoms of chronic cholecystitis are, therefore, pain of a characteristic type, flatulence with eructations, nausea or vomiting or both, and constipation.

Treatment.

Pre-operative.—Assuming the diagnosis to have been made and operation decided upon, it is advisable to have a careful examination of the heart carried out. Many of these patients suffer from myocardial changes which can only be discovered by the electro-cardiograph. If this examination prove satisfactory, glucose and calcium are administered for a week; oral cleansing and intestinal elimination provided for.

Operative.—The procedure adopted depends on many factors. If the subject is old and decrepit, with evident cardio-vascular or renal changes, and where the chief indications are the relief of pain and vomiting, the method which can be carried out most quickly and with the least disturbance should be employed. This is undoubtedly cholecystostomy. Later, if considered advisable, removal of the gall-bladder may be undertaken.

Cholecystectomy is the operation of choice in well-marked chronic cholecystitis, with or without stones, both in view of the satisfactory results attending it and also the removal of a potential source of cancer. In carcinoma of the gall-bladder, stones are practically always present.

There are, however, cases which both clinically and radiographically suggest loss of function, yet at operation very slight naked-eye changes are apparent. The gall-bladder may be slightly altered in colour, but thin-walled; there may be delicate adhesions to neighbouring organs and even stones may be palpated, yet we hesitate to condemn the viscus. I am now swinging round to the view that if the stones are removed and drainage provided there is a possibility of the function being restored. My attention has been directed to the recently published work of Professor Pribram,[4] who says that his experience has led him to be more conservative than formerly in resecting the gall-bladder. Asserting that the results of cholecystostomy are far from satisfactory, he has devised an operative measure which he believes will restore gall-bladder function and avoid possibility of stasis. This consists in anastomosing the neck of the gall-bladder to the side of common duct, thus preserving the pressure-regulating mechanism.

If the results following this procedure prove satisfactory, many gall-bladders now sacrificed will be saved, and the number of cases with recurrence of symptoms following resection will diminish, for, as we believe, the commonest cause of this return is spasm of the sphincter of Oddi.

Bibliography.

1. Eusterman, *Journal of American Medical Association,* 1924.
2. Graham and Others, "Disease of the Gall-Bladder and Bile Ducts."
3. Scrimger, *Canadian Medical Association Journal,* 1923, quoted from 2.
4. Pribram, *Surgery, Gynæcology, and Obstetrics,* January, 1935.